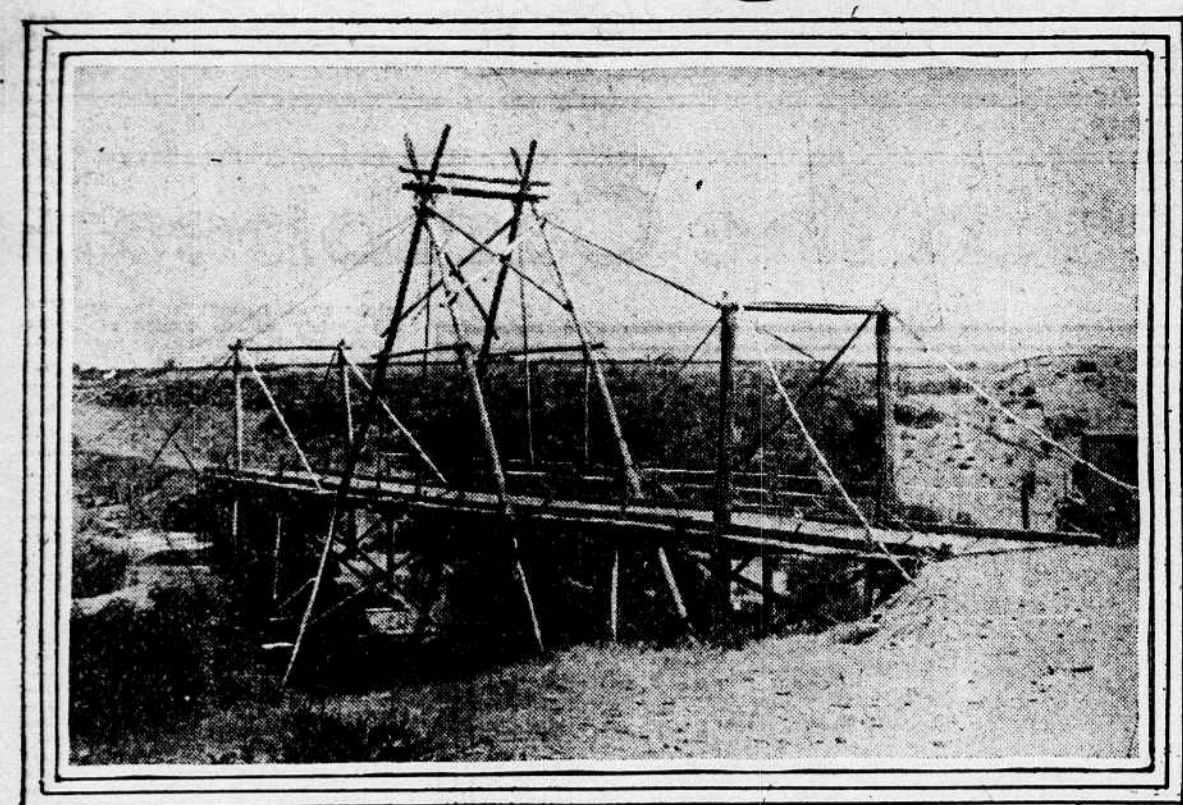


# Work of Engineer Corps indispensable to Our Army



BRIDGE IMPROVED BY ENGINEERS FROM ANY MATERIAL THEY CAN LAY THEIR HANDS ON.

Special Correspondence.

WASHINGTON, D. C., August 25, 1916.

THE engineers of the regular army in Texas and Arizona have had to select the sites, lay out and construct camps for the unexpected occupancy of over a hundred thousand troops of the organized militia.

As these camps are to be more or less permanent, the locations must be healthful, near plentiful supplies of uncontaminated water, of good drainage, convenient to railroads and of strategic and military importance.

The Engineer Corps, U. S. A., is comparatively small, and the engineer units of the National Guard are far below the numerical standard. In consequence the burden has been a heavy one, but nothing to what it would be in case of actual hostilities.

It is unfortunate that in the organized militia this auxiliary body should be relatively so small. According to the last report of the chief of the militia division, there were scattered throughout the forty-eight states only sixty-nine commissioned officers of engineers and 1,118 enlisted men or about one-third of the number of the regular army. This involves an annual expenditure of \$2,000,000.

The military engineer's functions in time of war include construction and repair of roads, railroads and bridges, the construction of fortifications, the construction of camps, field works, selection of lines, permanent military works, demolition and all kinds of matters arising from these duties.

The corps at present consists of 255 commissioned officers, about half of whom are engaged in the purely military side of their work, a few are engaged in both military and civil engineering, and the remainder are now engaged wholly in civil engineering.

All officers are assigned at times to civil and at other times to military duties, for this is the best way to develop the all-around engineer for both military engineering and civil engineering work, and that is what the army must have. Most of this civil work is done in connection with the rivers and harbors, which are under the jurisdiction of the Secretary of War.

The military engineer staff officer should take the responsibility of opening the way for the army's advance by making roads, bridging streams where necessary, laying out and constructing camps of defense. He must be in the confidence of the commanding officer, so that he can anticipate the general moves of the army, and direct the engineering work in the most efficient manner. He must also be a man of high character and high ability, and one who is willing to take the responsibility of opening the way for the army's advance by making roads, bridging streams where necessary, laying out and constructing camps of defense.

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It is for just this class of motherless, lonely boys that Mrs. Emma Ferguson Ellis organized her correspondence club and provided mothers. Mrs. Ellis lives in Indianapolis, Ind. She is fifty-two years of age and has a son and daughter of her own, and a heart big enough for other sons and daughters less fortunate.

She is well known in the city schools of Indianapolis, where she does substitute work. Mrs. Ellis has no great amount of money to carry on her enterprise, in fact, her circumstances are but moderate. But she has made up in earnestness and enthusiasm whatever she may have lacked in funds. She has frequently worked far into the night answering letters of inquiry, sending a bright word of hope to a forlorn boy, and doing miscellaneous club work.

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It had frequently occurred to her that the average American's attitude toward the men of the army and navy was an entirely mistaken one. In private, every day life soldiers and sailors were made to feel an undesired social ostracism; but when trouble appeared on Uncle Sam's horizon these same men were supposed to drive the enemy away, and in return some few achieved glory, but the majority received no more than an impersonal perfunctory thanks.

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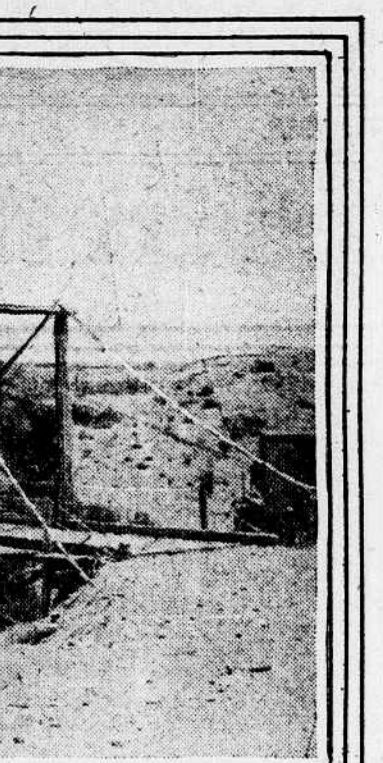
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In most phases of military work the great demand is for speed and completion at the cost of anything—money, material and men—everything but time.

Thus, if a civilian engineer had to construct a bridge across a stream, he would first estimate the required strength of the foundations, the quantity of structural steel he would have to order, remembering that when he was ready to begin actual operations traffic at that point could be held up or diverted until the bridge was ready for use.

A military engineer cannot think the least bit that way. His one problem is how to get the forces to the other side with the least delay, no matter what the making of the bridge. There is a ford which can with a little labor be made available he will not bother with the bridge at all. If there were a bridge which the enemy has destroyed he may, if the work of demolition has not been done, be able to use all or some part of it for the new temporary work.

If he cannot make anything out of the wreckage he may build on the foundations. If there is anything there which he can use to advantage in crossing the stream, and he fails to make use of it to shorten the time of completion, he is not doing the best that a military engineer can do. He may use his pontoons or he may figure that they will be more needed elsewhere.

In addition to this fundamental difference of method and "point of view," the problems themselves are different. Civilian engineers have erected marvelous bridges. The suspension bridges between Manhattan and Brooklyn, the cantilevers at Niagara and across the Mississippi at St. Louis are evidences of what they can do. Those same engineers, however, were never, in all probability, obliged to send men into the woods to cut down trees, frame them into crude piers on either side of a stream; stretch ropes made, it may be, of hemp instead of wire, across the tops from shore to shore; fasten to these improvised cables rough hangers and attach to them the cross-pieces supporting the stringers for the road.

The civilian engineer's training develops thoroughness and permanency at the expense of time of completion.

Of the 200 waiting mothers Mrs. Ellis says: "They are of all denominations, and every state in the United States is represented." New York and Wisconsin have more volunteer mothers than the other states, and of these two New York takes the lead with thirty-three mothers. Mrs. Ellis' object is to make a chain of mothers around the coast of the entire country, for it seems to be in those parts that the prejudice is most keen and where spiritual uplift and the right home influence are most needed. If the work continues to grow as it has in the last few months, and if enthusiasm, the fourfold need of mothers will be complete before any great number of moons have waxed and waned.

It is evident that Mrs. Ellis' work has attracted not only sympathy, but genuine interest and warm sympathy. Prof. Elmer F. Connie, at Montclair, N. J., communicates with Mrs. Ellis as different ships come to port there. Mrs. Ellis then writes him the names of the boys on those particular ships who have asked for the club's assistance in providing mothers, and Prof. Connie invites each boy to take a meal with him at home.

To an orphaned wanderer this new contact with the warmth of a real home means a new grip on life. Prof. Connie makes it a point also to visit these boys. If they are blue he cheers them; if they are in trouble he comforts them; if they have a problem to face he advises them; if they wish a "lark" he helps them get the right sort in the right way.

Mrs. Ellis wants just another such worker in Boston. The influence of a kind, broadly sympathetic, maturely wise friend in the lives of these boys is far reaching. Its importance is incalculable. Mrs. Ellis is asking for a volunteer, and states, incidentally, that all the work is volunteer.

Her aim has remained the same from the beginning, and she covers the ground of the entire work in her club fifty have absolutely no family ties; not even the remotest of ties can be discovered for them. The ages of these 212 range from seventeen to thirty-two years, which shows that a number of boys trained to a broader,

hered, foot and artillery, may cross. Fortunately on their river and harbor work the Corps of Engineers have much experience in just this sort of rough-and-ready field engineering—in building bank protection and levees along our great rivers and maintaining them in time of flood—in carrying out the details of breakwater and jetty building and dredging, in removing snags, rocks and wrecks. Here is a broad field where the military and civil work of the Engineer Corps are of mutual value.

It is reasonably certain that the average civilian engineer has had little if any experience in the construction of pontoon or floating bridges, that he is not so dextrous that a good one who has had some experience in military training camp cannot quickly learn how to put one down.

The operation consists of placing in position from shore to shore a line of pontoons at right angles to the direction of the bridge. They support five lines of stringers, on which are placed planks to form a road bed. It sounds like an easy thing to do, and so it is—for men who know exactly how it must be done under the particular conditions of each case.

The pontoons, or scowlike boats, weighing 1,500 pounds are transported by the engineers on wagon bodies. They sometimes are moored one by one; building the bridge structure from the innermost pontoon to the next one as it in turn is anchored in position. When both banks are in position, the pontoons may be extended from each side until they meet near the middle of the stream.

At other times, depending upon the tide or the current, it is better to construct sections of the bridge on the piers along the river bank, where the engineers and their work may not be so exposed to an enemy fire; to swing the completed sections into the stream and moor them as they drift into position.

A bridge properly constructed on wooden pontoons will carry a load of nine tons to each foot, and properly put together is safe. But if there should be a break the loss of material would be a serious one. These pontoons are made of steel, and are not to be mistaken in his design or his method. He must make allowance for the rise and fall of the tide, for protection against drift or ice. The men must make no mistake in construction. The parts are

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The number of troops of every branch of the service being known, the engineer must determine the space required for each, the location of latrines and incinerators, and the whole command must be disposed according to certain rules, so that an officer who is up to his business can know, at a glance, where each man is located.

In active campaigning the camp-laying is not so complex; but it comes to the engineers to select the locations and to establish the lines according to the topography. If the position is one which is to be held and the camp is to be fortified, of course the engineers make the plans and use their own and other men they can get hold of to do the work.

In battle, the attacks are launched from positions often selected by the engineers, and by locations and construction of those positions success or failure may often depend on the fighting as that of western Europe the men going into a charge carry their trenching tools and their own shovels. These are a little larger than an ordinary trowel and are used by the men at a pause in the fighting to scoop out shallow

of the hard work on shipboard, or at army post, and in their desire to lighten the toll of those boys with more than the kindest of wishes, these mothers send many welcome little presents of good home-made goods, a new picture of son or daughter, or mutual friend, and now and then a package of real, home-cooked food.

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Washington is famed as a "great place for crabs." Well, may this be true, for the city lies within short distance of the principal crab fisheries of the Atlantic coast—those in Chesapeake bay.

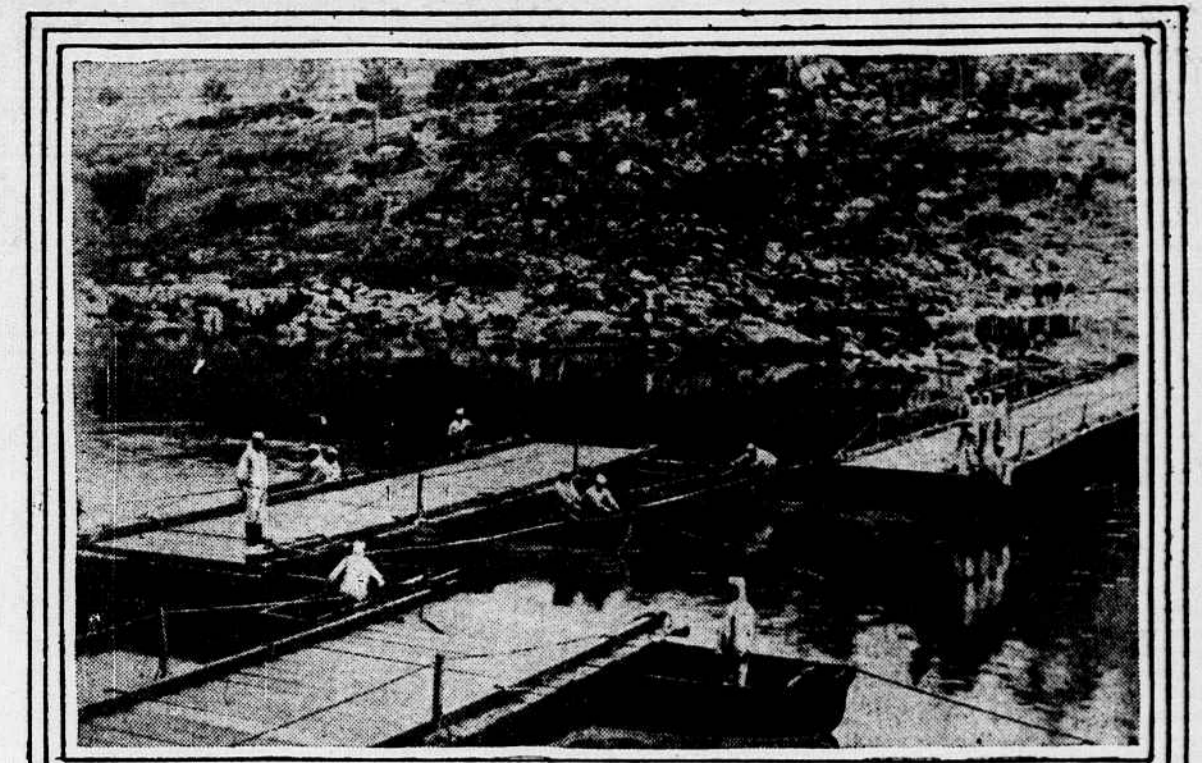
But the city's reputation in this one line is in jeopardy. Season by season for the past ten years the crab supply has been slowly diminishing, and this year the dealers are noticing that the number of crabs next to market is showing a marked decline. It is difficult to secure as many hard-shelled crabs as the trade demands, to say nothing of the soft-shelled ones, which are unusually scarce.

It is possible that the snowy crab-fake is destined to become only a luxurious delicacy. The bureau of fisheries has been moved to get to the bottom of the matter. One of its crab experts is now down in the Chesapeake bay region making a thorough study of the causes of the decline of the crab output. He is going from crab fishery to crab fishery studying crab life at first hand from every angle.

Generally speaking, it is thought that the chief cause of the decreased supply is due to the very extensive fishing which has been carried on within the past few years around these shores. No attempt has ever been made to prepare for the future's output by such means as artificial propagation as scientific fishermen now use in regard to that other valuable crustacean, the lobster.

Winter as well as summer has seen an uninterrupted pursuit of the hard-shelled crab, such persistent "crabbing" could not be without the effect which it is now beginning to show. Particularly scarce this year are the soft-shelled crabs. This scarcity cannot, however, be ascribed to the general decrease in the crab supply; on the contrary, neither can it be accounted for at all. Summer is the true molting time and the crabs usually cast off their hard shells at this time in great abundance. For what reason they are holding tenaciously to their shells this year cannot be said.

The soft-shelled crab is, of course, the more valuable form of the small blue crab, which is the water bug's edible variety of this section of the country. It is not a different species



PUTTING THE MID-STREAM SECTION OF A PONTOON BRIDGE IN POSITION.

put together with lashings, and every part must be put in its exact place or a break is apt to follow. For such work a specially trained body of men is indispensable.

Another of the duties of the Engineer Corps is to open and maintain roads and highways for communications behind the lines and for the advance of the troops and their supplies. In such work the civilian road builder approaches more nearly the military constructor, especially on that work which lies behind the line, where permanence is a greater consideration, and where the nature of the work does not call for highly skilled labor.

It seems hardly necessary to say that the civilian map maker is better qualified than the untrained citizen to make a military map, and without any military training the most important features of the landscape, from the military standpoint, might easily be omitted. Therefore, the civilian map maker needs special training in this work, but it will come to him much more easily than to a novice.

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low holes in the ground, throwing the dirt toward the enemy. Into this trench the men crawl and have just that much protection from rifle and machine gun fire—not much from shrapnel and shell.

At the first opportunity, when the trench has subsided, if the position is to be held, along come the engineer force with their trenching equipment—heavy spades, axes, mattocks and picks. They give new lines and turn in all hands available to dig trenches that will give better protection.

These locations must be made with skill. If placed too far behind a ridge, the men within them may not resist a frontal charge. After a short time spent in field service the young engineer officer is sent for a couple of years to the post-graduate engineering school at Washington barracks for further courses in engineering.

Therefore they receive alternating duties as military and civil engineering. As this course has been found to provide the best training and experience to produce the best all-around man in both civil and military engineer. The civil work benefits the soldier; and the soldier's experience, training and discipline aid him in the organization of the civil operation.

In addition to schools for officers' training, instruction has been established for the enlisted men of the engineer forces of the regular army. One at the Washington barracks may be taken as typical of the course. They have the general service training, which includes care of arms, first aid, personal hygiene, guard duty, equipment for field service, camping, cooking, night operations, swimming and many other exercises.

Practical courses fit them for special work, individual and collective use of cordage and lumbering and excavating tools, rowing and laying pontoon bridges, bridge expedients, repairing roads, field fortifications, field and siege works. Special engineer training is given to selected men in demolition, surveying, map making, carpentry, blacksmithing, masonry, pipe fitting, management of gasoline engines, motors, searchlights and other practical subjects.

With this training of this sort the work of the regulars reaches the highest standing; and with experience and practice organized and trained engineers will be of great value in case of sudden expansion of the army because necessary in upholding the traditions of the army engineers. They have been received and recommended by the American army's first general, George Washington.

Washington is famed as a "great place for crabs." Well, may this be true, for the city lies within short distance of the principal crab fisheries of the Atlantic coast—those in Chesapeake bay.

But the city's reputation in this one line is in jeopardy. Season by season for the past ten years the crab supply has been slowly diminishing, and this year the dealers are noticing that the number of crabs next to market is showing a marked decline. It is difficult to secure as many hard-shelled crabs as the trade demands, to say nothing of the soft-shelled ones, which are unusually scarce.

It is possible that the snowy crab-fake is destined to become only a luxurious delicacy. The bureau of fisheries has been moved to get to the bottom of the matter. One of its crab experts is now down in the Chesapeake bay region making a thorough study of the causes of the decline of the crab output. He is going from crab fishery to crab fishery studying crab life at first hand from every angle.

Generally speaking, it is thought that the chief cause of the decreased supply is due to the very extensive fishing which has been carried on within the past few years around these shores. No attempt has ever been made to prepare for the future's output by such means as artificial propagation as scientific fishermen now use in regard to that other valuable crustacean, the lobster.

Winter as well as summer has seen an uninterrupted pursuit of the hard-shelled crab, such persistent "crabbing" could not be without the effect which it is now beginning to show. Particularly scarce this year are the soft-shelled crabs. This scarcity cannot, however, be ascribed to the general decrease in the crab supply; on the contrary, neither can it be accounted for at all. Summer is the true molting time and the crabs usually cast off their hard shells at this time in great abundance. For what reason they are holding tenaciously to their shells this year cannot be said.

The soft-shelled crab is, of course, the more valuable form of the small blue crab, which is the water bug's edible variety of this section of the country. It is not a different species

watched carefully and put aside together so that as soon as their molting takes place they may be hustled off to market without delay. Crab fishing cannot be done in the soft-shelled specimens; nor is it desirable for the hard-shelled crabs caught in the greater part of the trade. Ordinary crab fishing has assumed all of the proportions of a dignified industry.